

# ABSTRACTS Selected from *Journal of Northeast Forestry University* (in Chinese)

**Study on Genetic Structure of Best Provenance of *Larix gemilinii* (I) — The Linkage Genetic Relationship of MDH and GOT Enzyme**/Huang Qijun (Forestry Institute of CAF, Beijing 100091, China); Xia Dean, Lu Yifang *et al*// J. Northeast For. Univ. -1997, 25(2).-5 ~ 8

Several population of *Larix gemilinii* were studied By means of isozyme technique. The results showed that: both MDH and GOT enzyme system are controlled by four loci in the population of *Larix gemilinii*. There is a clear linkage relationship between MDH-3 and MDH-4, GOT-1 and GOT-2. The value of each recombine is 0.143 and 0.243 respectively In different space, the number of alleles and the distribution of alleles in same enzyme are different.

**Key word:** *Larix gemilinii*, Isozyme analysis, Genetic linkage

**Trend Analysis of Geographic Variation on the Provenances of *Platycladus Orientalis*(L.) Franco**/Hong Wei, Wu Chengzhen (Fujian Forestry College, Nanping 353001, China)// J. Northeast For. Univ. -1997, 25(2) -1-4

Trend analysis of geographic variation on tree provenances is basic work for provenances divisions and dividing line designating of seeds allotting. "Kriging" technique is a stochastis approach to interpolating sparse observation records. In this paper, with the method of "Kriging" spatial interpolation technique, data of 27 *platycladus* is analyzed. The results show that "Kriging" spatial inter-polation technique provides a new and powerful method for tree provenances research. Its regression pricision of "Kriging" technique is 98.8% and it reflects trend imformation over 98% of *Platycladus orientalis* provenances geographic variation. It will provide theory basis for provenance divisions and seeds allotting of platycladus orientalis.

**Key words:** *Platycladus orientalis*, Provenances tast, Geographic variation, "Kriging" technique

**The Geographic Variation of 15 Years Old Provenance and the Provenance Selection of *Picea koraiensis***/Wang Qiuyu, Wu Yueliang(Northeast For. Univ.; Harbin 150040, China), Cai Baoming *et al* //J. Northeast For. Univ.-1997, 25(3) -6-8

The results from the study on growth characteristics of eight provenances in 15 years old,three representative provenance trials of *Picea koraiensis* show that there are significant genetic variations within the natural distribution area of *Picea koraiensis*.The latitude and altitude are the main factors that affect the provenance growth characteristics. In addition,the growth stability of growth characteristics from three representative provenance trials is also studied. It indicated that Chaihe, Tianqiaoling, Dafeng and Wuyiling, as provenances with high yield and genetic stability, should be applied to the forestry production of *Picea koraiensis* in the future.

**Key words:** Geographic variation, Genetic stability, Provenance selection

**The Early Stage Selection Technology for Family System of *Larix olgensis***/Ding Zhengfang, Wang Jingzhang, Fang Haifeng *et al*(The Forest Management Institute of Liaoning Province, Benxi 117114, Liaoning, China)//J. Northeast For. Univ. -1997, 25(3) -65-87

Based on the data of growth of the excellent tree family system of *Larix olgensis* by free pollination, the increasing production result of excellent tree family system was analyzed, and the variance quantities of different ages, changes on heredity, and changing tendency of correlation coefficient of genetics in varying ages were studied. Selection efficiency in early stage was estimated. The results showed that the tree height, diameter at breast-height and volume increased 3.86%, 11.0% and 28.9% respectively. The early selection for tree height may begin at 5-year-old. Diameter at breast-height that is a major index can be made at 7-year-old. The risk of early stage selection was also discussed.

**Key words:** *Larix olgensis*, Family system, Early stage selection, Tree age

**Research on Cutting Cultivation of *Picea meyeri***/Ren Jianzhong, Zhao Jiankang, Zheng Zhili (Center of Forest Science and Technology, Experiment Bureau of High-Yield Poplar Forest of Shanxi Province, Huairan 037006, China)//J. Northeast For. Univ. -1997, 25(3) -68-70

*Picea meyeri* cutting experiment was carried out on the hotbed in the greenhouse under the ground. The internal and external factors of the rooting and the factors that affected the rooting were studied, including the kinds and concentrations of root inducing hormone, soaking time, kinds of substrate, the branch taking location and different lateral branches, and the cuttings' age and mother trees' age, etc.. The rooting rate of the optimum handled combination reached 90%.

**Key words:** *Picea meyeri*, Cutting cultivation, Internal factor, External factor, Rooting

**Studies on Introduction of *Pinus ponderosa***/Zhang Ligong, Wang Xiwu (Forestry Academy of Liaoning Province, Shenyang 110032, China), Zhang Renci *et al*// J. Northeast For. Univ. -1997, 25(2) -9-12

The stem analysis, biomass measurement, root system observation, habit of flowering and cone bearing, resistance characteristics of 61 years old *Pinus ponderosa* Laws were made in Xiongyue Arboretum of Liaoning Province. The growth and adaptation of *P. Ponderosa* introduced in 1984 were observed and studied in regional experiment plantations in Liaoning Province. Study results show that *P. Ponderosa* is a good species with the characteristics of fast-growing, normally flowering and bearing cone, wide adaptation to different soils and climates, and no serious pest and disease infection. The most suitable areas for *P. ponderosa* in Liaoning are southern part and low or middle mountainous regions of eastern parts.

**Key words:** *Pinus ponderosa*, Introduction, Biological character

**Mechanization for Establishing Fast-Growing Forest**/Zhang Xueming (Northeast For. Univ., Harbin 150040, China), Zhang

Ming, Li Hong *et al* //J. Northeast For. Univ. -1997, 25(2) -72-74

The situation of mechanization for establishing fast-growing forest in China was analyzed. According to the technological requirements of establishing fast-growing forest, this study puts forward a scheme of machine pattern for ground clearance, ground preparation, planting, weeding, loosen soil, fertilization, irrigation and as well as thinning tending. Developing direction of machinery for fast-growing forest was also discussed. Concerning with fast-growing forest, the key research should be set on the thinning machine used in middle and young aged forest and fertilization machine.

**Key word:** Fast-growing forest, Mechanization, Forest establishing technology

**Height Growth of *Deyeuxia angustifolia* and Its Relationship with Biomass of Population in Typical Meadows in Sanjiang Plain**/Ni Hongwei(Natural Resources Institute, Heilongjiang Academy of Science, Harbin 150040, China), Chen Jihong, Wang Yongji *et al* //J. Northeast For. Univ. -1997, 25(2) -13-17

*Deyeuxia angustifolia* is a constructive species in typical meadow in Sanjiang Plain. This paper states the relations between the height growth and aboveground biomass. All the maximum values of height ( $H$ ), aboveground biomass( $B_p$ ), stem biomass ( $B_s$ ) and leaf biomass ( $B_l$ ) occurred at the end of July, being as 112.67cm, 996.95 g/m<sup>2</sup>, 571.48 g/m<sup>2</sup> and 411.58 g/m<sup>2</sup> respectively. Before the occurrence of the maximum values, height growth obeys Logistic relation ( $r > r_{0.05}$ ), and the others obey exponent relation ( $r > r_{0.01}$ ). There is good relationship among them ( $r > r_{0.05}$ ). The growth rate of height ( $V_H$ ) reaches its maximum value 1.7707 cm/d at the end of June to middle of July. Before this period, the growth rate of height is more than 1.00 cm/d and after this period it rapidly falls down. The dynamic change of frequency distribution of plant height is of low-high-low trend, and the focus distribution frequency is of the trend of concentration to dispersion, which reflects the spatial distribution characteristics of height.

**Key words:** *Deyeuxia angustifolia* population, Height growth, Biomass

**Research State and Advance on Soil Degradation under Larch Plantations**/Pan Jianping (Northeast For. Univ., Harbin 150040, China); Wang Huazhang; Yang Xiuqin //J. Northeast For. Univ. -1997,25(2) -59 ~ 63

This paper summarized the results of recent researches on soil degradation under larch (*Larix. gamelinii*, *L. olgensis*) plantations in Northeast China. Most result demonstrated that, larch plantations have negative influence on forest soils. The soil degradation could be illustrated by the depletion of forest plantation productivity and the decline in many soil properties, such as bulk density, soil porosity, soil structure, acidity, organic matter content and humus composition, total content of nutrient elements (N, P, K, Ca, Mg, etc.) and their availability, the amount of soil microorganisms and soil enzyme activity. The mechanism of soil degradation was analysed from the view point

of ecosystem, nutrient cycling, soil chemistry and anthropogenic disturbance. Finally, the strategy and measures to prevent soil degradation were put forward and discussed, including stand structure regulation, shifting culture, fertilization and soil amelioration etc.

**Key word:** Larch, Plantation, Soil degradation

**Physical and Chemical Properties of the Soil for Larch Plantations**/Wang Hongjun, Gong Fang, Zheng Baoren *et al* (Forest Industry Management Cadre College of Heilongjiang Province, Yichun 153106, Heilongjiang, China)//J. Northeast For. Univ. -1997, 25(3) -75-79

The physical and chemical properties of the soil in pure larch plantations of different ages, broad-leaved forest and natural Korean pine forest were measured by standard-plot sampling and normal lab analysis. Results of the research show that the soil volume weight of the larch plantation was increased; the soil's porosity was decreased; the water-keeping ability of its capillaries was obviously increased; its aeration was weakened; with the increasing of the stand age, the soil organic material content and its nutrient content became lower, its texture and acidity were not significantly changed; its cation exchange became less, and its fertilizer keeping and supplying ability was comparatively weakened. The potential productivity of the soil of the Larch plantations has the tendency of deterioration.

**Key words:** Larch plantations, Soil, Physical and chemical properties

**Structural Characteristics of Soil Animal Groups in Liangshui Nature Reserve**/Zhong Weiyan, Yin Xiuqin, Chen Peng(School of Urban and Environmental Science, Northeast Normal University, Changchun 130024, China)//J. Northeast For. Univ. -1997, 25(3) -80 ~ 85

A total of 6161 soil animals in 51 groups, belonging to 4 phyla, 8 classes, 21 order and 39 families, were obtained from 5 habitats in Liangshui Nature Reserve. Concerning large-scale soil animals, there are 3 dominant groups and 7 frequent groups. To middle-small-scale soil animals, there are 2 dominant groups and 8 frequent groups. The virgin *Pinus koraiensis* broad-leaf forest has more groups and individual numbers of largescale soil animals. In man-made *Pinus koraiensis* forest, the group number of middle-small-scale soil animals is the most. In man-made *Picea* and *Abies* forest, the individual number of middle-small-scale soil animals is the most. The groups and individual number of soil animals decreased with the increase of soil layer depth.

**Key words:** Soil animal, Horizontal structure, Vertical structure

**A Computer System of the Stand Silviculture Models of Building Wood for *Larix olgensis* Plantation**/Li Meng (Heilongjiang Forestry Institute, Harbin 150040, China), Li Yuan, Man Dongbin *et al* //J. Northeast For. Univ. -1997, 25(3) -26-29

A computer system of stand silviculture models of building wood for *Larix olgensis* plantation was established based on an integrated stand growth model in Visual Basic language. It

consists of 5 parts: parameter setting, growth simulating, graphic displaying, table printing and model reporting. Each was divided into a few modules according to its functional design. The system optimization was found using the method of dynamic programming. An economic analysis was completed along with the growth simulation.

**Key words:** *Larix olgensis*, Plantation, Building wood, Stand silviculture model

**Utilization and Extention of *Potentilla discolor* Bunge** /Zhang Xiuli, Yuan Jingbo, Cong Liangjun *et al* (Department of Landscape Architecture of Daqing Dqaing 163311, China)//J. Northeast For. Univ. -1997, 25(3).-86 ~ 87

There are few gardening plants in Daqing City because of drying weather and alkaline soil. It is urgent to exploit native gardening plants. The biological and ecological characteristics of *Potentilla discolor* Bunge, a wild and native herbaceous plant in Daqing, phenological and reproductive properties of the species were studied. Results show that *Potentilla discolor* is vevy adaptable and resistant to local environmental conditions. This gardening species may be applicated in landscape architecture and gardening in Daqing City.

**Key words:** *Potentilla discolor*, Gardening plants, Alkaline soil

**Likely Impact of Rising Atmospheric CO<sub>2</sub> Concentration on Tree Growth and Physiology**/Liu Shirong, Jiang Youxu, Guo Quanshui(Institute of Forest Ecology & Environment Science, Chinese Academy of Forestry, Beijing 100091, P. R. China)//J. Northeast For. Univ. -1997, 25(3) .-30-37

An internationally current research on elevated atmospheric CO<sub>2</sub> in relation to tree growth and physiology was reviewed systematically. The review covered methodology and techniques being adopted for experimental investigation of trees to elevated CO<sub>2</sub>, and ultimate research results from impact experimental studies, including the enzyme changes of cell on horizontal, physiological response of leaf blade on the level, level growth of individual tree, and allocation carbon and nitrogen and interaction. The research tendency on the effects of climate changes caused by rising atmospheric CO<sub>2</sub> concentration on trees and forests was also analyzed.

**Key words:** Tree, Physiology, Growth, Atmospheric CO<sub>2</sub>; CO<sub>2</sub> Concentration

**The Effect of Site Preparation and Tending on *Larix leplelepis* Young Growth**/Dong Jian, Zhao Wenhua, Yuan Hui *et al* (Liaoning Academy of Forestry, Shenyang 110032, China)//J. Northeast For. Univ. -1997, 25(3) .-22-25

The three sizes of site preparation and two tending manners were used for 5-year-old *Larix leplelepis* plantation in the areas of Kaiyuan, Kuandian, Fushun, Qingyuan of Liaoning Province. The experiment of two-factorial randomized blocks was designed for analyzing. The site preparation in size of 40 × 40 × 30 cm (length × width × depth) is reasonable for short-rotation industrial forest of *L. leplelepis*. In young growth period, the tree height and diameter at breast height were increased by 12.6% and 15% respectively, comparing with the site prepara-

tion in size of 25 × 25 × 30 cm. Concerning the cost, 166-202 yuan/hm<sup>2</sup> can be cut down, as comparing with the site preparation in size of 60 × 60 × 30 cm. Two times of tending made every year in first and second year and one time in third year presented best result. This tending way not only improved tree growth, but also reduced investment by 150 yuan (RMB) /hm<sup>2</sup>, meanwhile, the reserve percentage is raised.

**Key words:** *Larix leplelepis*, Site preparation, Tending, Economic effect

**The Control Index of Poplar Leaf Rust Disease**/Meng Fanrong, Huang Yongqing, Ni Naihua *et al* (Northeast For. Univ., Harbin 150040, China)//J. Northeast For. Univ. -1997, 25(3) .-18-21

The growth and loss rate of 1-, 2- and 3-year-old *Populus simonii* × *P. nigra* that suffered from poplar rust disease were measured according to the disease intensity in Fuyu nursery, Heilongjiang. The disease index of economical injury threshold for cuttings, stump seedlings and sapling was determined as 14, 21 and 24 respectively. Selected key control should be made when disease index is in 15-18 (cuttings) or 22-23 (stump seedlings) or 25-26 (saplings) and overall control must be conducted when the disease index is above that value.

**Key words:** Poplar, Leaf rust disease, Economical injury threshold, Control index

**The Life Course of *Chilocorus kuwanae* Silvestri**/Ma Ling, Li Chengde, Liu Jingquan *et al* (Northeast For. Univ., Harbin 150040, China)//J. Northeast For. Univ. -1997, 25(1) .- 59 ~ 61

*Chilocorus kuwanae* is a key nature enemy for *Quadraspidiotus gigas* (Thiem et Gerneck) in the forest region of Northeast China. The life cycle and death cause of *C. kuwanae* were observed and analyzed. The life-span of overwintering adults was 72 days. Larva period of ladybirds at 19.59-22.62 °C lasted 21 days. Parasitism of *Homalotylus flaminus* (Dalman) on the larvae of ladybirds was the key factor of their death.

**Key words:** *Chilocorus kuwanae*, Life cycle, Death cause

**Predatory Function of *Chilocorus kuwanae* on *Quadraspidiotus gigas***/Ma Ling, Li Chengde, Liu Jingquan *et al* (Northeast For. Univ., Harbin 150040, China)//J. Northeast For. Univ. -1997, 25(2) .-64-67

*Quadraspidiotus gigas* (Thiem et Gerneck) is a main pest infesting poplar in Northeast China. *Chilocorus kuwanae* Silvestri as a key nature enemy, has good control function to *Quadraspidiotus gigas*. Based on former researches and observations made in Daqing, Heilongjiang Province, the maximum pest amount predated by an adult and different instar larvae of ladybird per day were calculated with Holling-II formula. Under the condition that all *Homalotylus flaminus* were eliminated, the insects predated by an adult, 1-, 2-, 3-, 4- and 5-instar larvae per day were 18.41, 1.6556, 2.0880, 6.1767, 19.3008 and 31.3480 respectively. When there existed parasitism of *H. flaminus*, calculated by Holling-III formula, the maximum pest amount predated by 1-, 2-, 3-, 4- and 5-instar larvae per day

were 2.38, 2.62, 9.33, 7.003 and 5.59 respectively. The artificial migration of one adult lady bird on trees of I or II infection grade reduced the population density of *Quadraspidotus gigas* for one damage grade under the condition of parasitism of *H. Flaminius* on ladybird's larvae, and the natural control ability reached 53%.

**Key word:** *Chilocorus kuwanae*, *Quadraspidotus gigas*, Predatory Function

**Research Advances of *Strobilomyia* spp. in Northeast China/** Yan Shanchun, Hu Yinyue, Meng Qingfan *et al* (Northeast For. Univ., Harbin, 150040, China)//J. Northeast For. Univ. -1997, 25(2) -53-58

*Strobilomyia* spp. are serious pests of the larch cones in the Northeast China. Many researches on the species composition, the biology, control and forecast have been done by Chinese researchers. There are seven species in Northeast China: *S. melaniola*, *S. baicalensis*, *S. infrequens*, *S. svenssoni*, *S. laricicola*, *S. luteoforceps* and *S. sanyangii*. Based on the research results, the research dynamics in China and other countries are introduced, and the problems need to be solved are discussed and analysed.

**Key words:** Larch, *Strobilomyia* spp., Northeast China

**The Early Stage Forecasting Pattern of Wood Properties of *Larix olgensis* in Plantation (II) — The Early Stage Forecasting of Wood Properties, the Evaluation of Wood Properties** /Wang Jinman, Li Jian, Liu Yixing (Northeast For. Univ., Harbin, 150040, China)//J. Northeast For. Univ. -1997, 25(2) -24-28

In this paper, based on the wood growth ring properties variation pattern of *Larix olgensis* A. in plantation and its results of classification of juvenile and mature period wood, applied the modern statistical forecasting theory, the theory and method of the early stage forecasting of wood properties were put forward. Many types of regression analysis were adopted and the best patterns of wood properties variation were selected. According to the data of juvenile wood properties, the model of early stage forecasting was set up. The early stage forecasting for the mature wood properties was made with the model. At the same time, the prediction precision was evaluated by the method of mathematical statistics. The qualities of making paper was evaluated by the evaluation of wood properties. The theoretical pattern of the early stage forecasting of wood properties in plantation was put forward. The results indicated that the prediction data were closed to the actual data. This theory and method can be effectively used in the early stage forecasting of wood properties.

**Key words:** Plantation, *Larix olgensis*, Early stage forecasting, Wood properties, Evaluation of wood quality

**The Variation of Wood Properties within Individual Trees for *Larix olgensis***/Duan Xihua, Zhang Hanguo, Pan Benli *et al* (Northeast For. Univ., Harbin 150040, China)//J. Northeast For. Univ. -1997, 25(2) -33-36

The variations of wood properties within individual trees

were studied for artificial stands of *Larix olgensis* at age of thirty and fifty-four. The basic density progressively decreased from the base to the top of trunks. The lengths of trachied increases progressively and become short step by step when it reaches the longest. The basic density and trachied length increases rapidly to the 20 rings from the pith to the cambium of trees, and then the increase extent become smaller. The basic density and trachied length at any radius orientation of breast height was used to estimate means of trunks. The method of timber wick is reasonable and practical sampling methods.

**Key words:** *Larix olgensis*, Wood properties, Variations, individual trees, Sampling methods

**Manufacturing Technique of Diisocyanate Particleboard from Rice-Straw**/Lu Renshu, Pu Anbin, Zhang Xianquan, *et al* (Northeast For. Univ., Harbin 150040, China)//J. Northeast For. Univ. -1997, 25(3) -14-17

The fault of rice-straw, as particleboard raw, is that its cellulose content is low and its SiO<sub>2</sub> content is high. It is very difficult to manufacture rice-straw into qualified particleboard with UF resin. 4, 4'-diphenylmethane diisocyanate (MDI) was used to manufacture particleboard from rice-straw in study. The results show that the mechanical properties of particleboard are up to the second-class of A type particleboard standard of China when the resin added is 5% and the density of particleboard is 0.75g/cm<sup>3</sup>. When a method of rising the density into 0.80g/cm<sup>3</sup> or resin added into 6% is used, the mechanical properties of particleboard are up to the high-class. This paper also discusses the production cost of MDI particleboard from rice-straw.

**Key words:** Diisocyanate (MDI), Rice-straw, Particleboard, Manufacturing technique

**Analysis of the Evenness of Veneer Peeling Thickness and Improving Measures**/Zhang Shaochun, Zhu Xiaosheng *et al* (Northeast For. Univ., Harbin 150040, China)//J. Northeast For. Univ. -1997, 25(2) -75-77

Through analysis and calculation of suffer force condition in peeling log, this article pointed out the peeling thickness uneven, that is the outer sides are thick but the middle is thin, is result of the bending deflection in peeling log. The result has been confirmed by experiment. Adopting the anti-bend press roll is the key to improve the precision of veneer peeling and the thickness evenness of the plywood. Rotary cut machine with anti-bend press roll should be adopted in veneer producing for saving wood resources.

**Key words:** Veneer peeling, Force analysis, Anti-bend press roll

(Responsible Editor: China Ruiha)